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FIG. 1

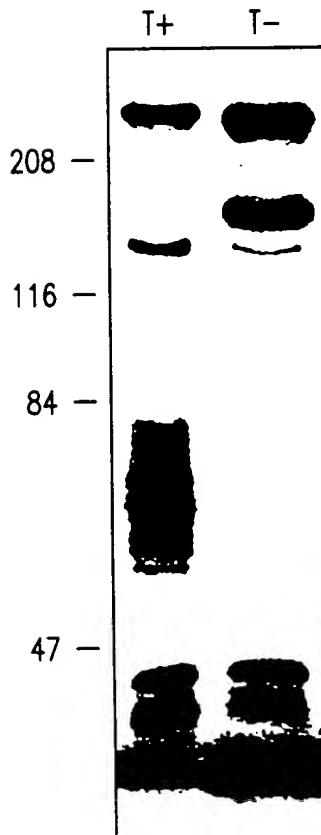
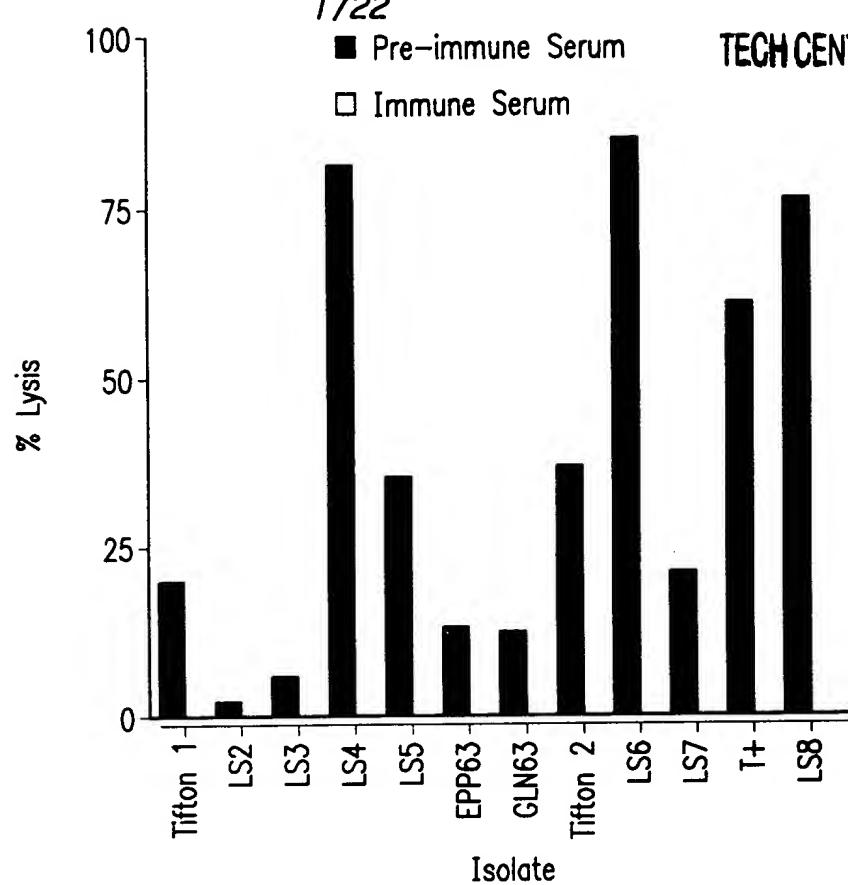
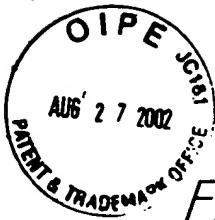


FIG. 2

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FIG. 3-1

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1 ATGTCCAATATAATGTAATTAATCTAATATTCAAGCAGGCTTGAATTCAACAAAGTCT 60
1 M S N I N V I K S N I Q A G L N S T K S 20

61 GGATTAAGGAAATCTTACTTGGCTATTCCAAAGATTATGATCCGCAAAAGGTGGACT 120
21 G L K N L Y L A I P K D Y S D P Q K G G T 40

121 TTAAATGATTTATTAAAGCTGCTGATGAAATTAGGTATTCTGGTTAGCAGAAGAGCCT 180
41 L N D F E K A A D E L G I A R L A E E P 60

181 AATCACACTGAAACAGCAAAAAAATCTGTTGACACAGATAATCAGTTCTCTCTCAC 240
61 N H T E T A K K S V D T V N Q F L S L T 80

241 CAAACTGGTATTGCTATTCGCAACAAAATTAGAAAAGTTCTTACAAAACATTCTACC 300
81 Q T G I A I S A T K L E K F L Q K H S T 100

301 AATAAGTTAGCCAAAGGGTTAGACAGTGTAGAAATATTGATCGTAAATTAGGTAAAGCA 360
101 N K L A K G L D S V E N I D R K L G K A 120

361 AGTAATGTATTATCACATTAAGCTTTGGGACTGCATTAGCGGGTATAGAACTT 420
121 S N V L S T L S S F L G T A L A G I E L 140

421 GATTCTTAATCAAAAAGGTGATGCTGCACCTGATGCTTGGCTAAAGCTAGTATTGAC 480
141 D S L I K K G D A A P D A L A K A S I D 160

481 TTGATTAATGAGATAATTGTAATCTATCTAGAGTACTCAAACGATTGAAGCATTCT 540
161 L I N E I I G N L S Q S T Q T I E A F S 180

541 TCACAGTTAGCAAAGTTAGGTTACTATATCGCAGGCTAAAGGCTCTAAATATAGGA 600
181 S Q L A K L G S T I S Q A K G F S N I G 200

601 AACAGTTGCAAAACTAAATTTCTAAACAAATCTGGTTGGAAATAATTACTGGT 660
201 N K L Q N L N S S K T N L G L E I I T G 220

661 TTGCTATCAGGCATTCTGCAGGCTTGCAGGCTTGCAGGATAAAATGCATCGACTGGCAA 720
221 L L S G I S A G F A L A D K N A S T G K 240

721 AAAGTTGCTGCAGGTTTGAATTAAGCAATCAAGTTATGGTAATGTAACAAAGCAATT 780
241 K V A A G F E L S N Q V I G N V T K A I 260

781 TCTTCATATGTTAGCACAACGTGTTGCTGGTCTATCAACTACTGGTGTGTTGCT 840
261 S S Y V L A Q R V A A G L S T T G A V A 280

841 GCTTAATTACTCATCGATTATGTTGGCAATTAGTCCTTGGCATTATGAATGCAGCA 900
281 A L I T S S I M L A I S P L A F M N A A 300

901 GATAAATTCAATCATGCTAATGCTCTTGTGAGTTGCAAAACAATTCCGAAAATTGGC 960
301 D K F N H A N A L D E F A K Q F R K F G 320



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FIG. 3-2

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961 TATGATGGGATCATTATTGGCTGAATATCAGCGTGGTGGTACTATTGAAGCTTCA 1020
321 Y D G D H L L A E Y Q R G V G T I E A S 340

1021 TTAACTACAATTAGTACGGCATTAGGTGCAGTTCTGCTGGTGT, TCCGCTGCTGCTGTA 1080
341 L T T I S T A L G A V S A G V S A A A V 360
1081 GGATCTGCTGTTGGTGCACCGATTGCACTATTAGTTGCAGGTGTTACAGGATTGATCTCT 1140
361 G S A V G A P I A L L V A G V T G L I S 380

1141 GGAATTTAGAAGCGTCTAACACAGGCAATGTTGAAAGTGTGCTAACCGTTACAAGGT 1200
381 G I L E A S K Q A M F E S V A N R L Q G 400

1201 AAAATTTAGAGTGGAAAAGCAAAATGGCGGTAGAACTATTTGATAAAGGCTATGAT 1260
401 K I L E W E K Q N G G Q N Y F D K G Y D 420

1261 TCTCGTTATGCTGCTTATTAGCTAATAACTAAAATTTGTCTGAGCTAAATAAGAG 1320
421 S R Y A A Y L A N N L K F L S E L N K E 440

1321 TTGGAAGCTGAACGTGTTATTGCAATACCCAAACACGTTGGGATAATAATATTGGTGAG 1380
441 L E A E R V I A I T Q Q R W D N N I G E 460

1381 TTAGCAGGTATTACCAAATTGGGTGAACGCATTAAGAGCGGAAAAGCTTATGCAGATGCT 1440
461 L A G I T K L G E R I K S G K A Y A D A 480

1441 TTTGAAGATGGCAAGAAAGTTGAAGCTGGTCCAATATTACTTTGGATGCTAAAAGGT 1500
481 F E D G K K V E A G S N I T L D A K T G 500

1501 ATCATAGACATTAGTAATTCAAATGGGAAAAACGCAAGCGTTGCATTCACTCGCCT 1560
501 I I D I S N S N G K K T Q A L H F T S P 520

1561 TTGTTAACAGCAGGAACGTAAACGTGAACGTTAACTAATGGTAAACTCTTATATT 1620
521 L L T A G T E S R E R L T N G K Y S Y I 540

1621 AATAAGTTAAAATTGGACGTGTAACGGCAAGTTACAGATGGAGAGGCTAGTTCT 1680
541 N K L K F G R V K N W Q V T D G E A S S 560

1681 AAATTAGATTCTCTAAAGTTATTCAAGCGTGTAGCCGAGACAGAAGGCACAGACGAGATT 1740
561 K L D F S K V I Q R V A E T E G T D E I 580

1741 GGTCTAATAGTAAATGCAAAAGCTGGCAATGACGATATCTTGTGTTCAAGGTAAATG 1800
581 G L I V N A K A G N D D I F V G Q G K M 600

1801 AATATTGATGGTGGAGATGGACACGATCGTGTCTTCTATAGTAAAGACGGAGGATTGGT 1860
601 N I D G G D G H D R V F Y S K D G G F G 620

1861 AATATTACTGTAGATGGTACGAGTGCAACAGAAGCAGGAGTTACAGTTAATCGTAAG 1920
621 N I T V D G T S A T E A G S Y T V N R K 640



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FIG. 3-3

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1921 GTTGCTCGAGGTGATATCTACCATGAAGTTGTGAAGCGTCAAGAAACCAAGGTGGTAAA 1980
641 V A R G D I Y H E V V K R Q E T K V G K 660

1981 CGTACTGAAACTATCCAGTATCGTATTATGAATTAAGAAAAGTTGGGTATGGTTATCAG 2040
661 R T E T I Q Y R D Y E L R K 2 V G Y G Y Q 680

2041 TCTACCGATAATTCAGTAGAAGAAGTAATGGTTCTCAATTATGATGTATT 2100
681 S T D N L K S V E E V I G S Q F N D V F 700

2101 AAAGGTTCTAAATTCAACGACATATTCCATAGTGGTGAAGGTGATGATTACTCGATGGT 2160
701 K G S K F N D I F H S G E G D D L L D G 720

2161 GGTGCTGGTACCGACCGCTTGGTAAAGGCAACGATCGACTTCTGGAGATGAA 2220
721 G A G D D R L F G G K G N D R L S G D E 740

2221 GGCAGATGATTTACTCGATGGCGGTTCTGGTATGATGTATTAAATGGTGGTCTGGTAAT 2280
741 G D D L L D G G S G D D V L N G G A G N 760

2281 GATGTCTATATCTTCGGAAAGGTGATGGTAATGATACTTGTACGATGGCACGGCAAT 2340
761 D V Y I F R K G D G N D T L Y D G T G N 780

2341 GATAAATTAGCATTGCAAGATGCAAATATATCTGATATTATGATTGAACTACAAAGAG 2400
781 D K L A F A D A N I S D I M I E R T K E 800

2401 GGTATTATAGTTAACGAAATGATCATTCAAGTAGTATTACATACCAAGATGGTACATA 2460
801 G I I V K R N D H S G S I N I P R W Y I 820

2461 ACATCAAATTACAAATTATCAAAGTAATAAAACAGATCATAAAATTGAGCAACTAATT 2520
821 T S N L Q N Y Q S N K T D H K I E Q L I 840

2521 GGTAAAGATGGTAGTTATCACTTCCGATCAAATTGATAAAATTGCAAGATAAGAAA 2580
841 G K D G S Y I T S D Q I D K I L Q D K K 860

2581 GATGGTACAGTAATTACATCTCAAGAATTGAAAAAGCTGCTGATGAGATAAGAGCAA 2640
861 D G T V I T S Q E L K K L A D E N K S Q 880

2641 AAATTATCTGCTTCGGACATTGCAAGTAGCTTAATAAGCTAGTTGGTCAATGGCACTA 2700
881 K L S A S D I A S S L N K L V G S M A L 900

2701 TTTGGTACAGCAAATAGTGTGAGTTCTAACGCCCTACAGCCAATTACACAACCAACTCAA 2760
901 F G T A N S V S S N A L Q P I T Q P T Q 920

2761 GGAATTTGGCTCCAAGTGTAG SEQ ID NO. 1 2784
921 G I L A P S V * SEQ ID NO. 2 928



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MbxA	MSNIN	VIKSNIAGL	NSUKSOURNE	YBAAFK.DX	DPQKG	38			
LktA	ASCHKAG	QSETOAG	SESLTGAKK	ETEONQ	DTEGG	59			
ApxIIA	KNKNQAGT	LNGCTTG	HSIQLNGAKK	FLYIPQG..	DSGGS	62			
H1yA	MPTEAQS	SAKQSA	ANKESACQS	TDAKKAQ	QTRNAG.NR	61			
MbxA	DEGJARLAE	EPNHTETAK	SVDIVNQFLS	QJQGIAISA	TKGEKFKH	SENKL	103		
LktA	NGIODVKA	EELGIVORE	SLGIIQTA	TERGIVSA	PQDKJQK	..L..KA	121		
ApxIIA	NGWODVKA	NDLGEIVORE	ERSNDIAK	PQDNJFK	FDREGYFA	.NPK	125		
H1yA	SSINDVIRTA	DELGEIVORYD	EKGNAITIQ	TEREVIFA	PQDKJQK	Q..KA	124		
MbxA	AKGI	DRKLGKSSN	VSTIISSE	TAABIEEDS	LIKK...	ADPAIAKAS	1D1N	163	
LktA	QQA	QDANAKA	VSGLOSSI	SWAGMDDE	ALQN...	N	SINCHAKAG	1E1N	180
ApxIIA	GNTE	ISQNLGKAN	VEGGLOSSI	SVSEVNLNE	LQN...	KD	PNGLEAKAG	1E1N	185
H1yA	GENKEGSAEN	IGDNLGKAGS	VLSTFQNF	TAASSKIDE	JKKQKSGGN	VSSSEAKAS	1E1N	189	
MbxA	ETIEN	QTEAASSQ	AKIGSTISQA	KFSNIEKE	ONE.	NFSKTN	GEETLISUL	SGISIA	227
LktA	SIEN	KLDEFGQ	SQFSSKQNI	KIGTJEDK	KNIGLDKAG	GBMIS	SGATA	245	
ApxIIA	ELMEN	QVDAEQT	SKIESHQNV	KEGGJSNKL	QMPDJKAS	GBD13	SGASA	250	
H1yA	QV.DTAASL	NNVNSQQL	NKGSVSNNT	KHENGVENKL	CNLPNDNIG	AGDNMSGT	SAISA	253	
MbxA	GFADKNAS	GGKVAAGFE	ISNOVJENAT	KAISSWIAQ	AVAAI	ISSI	STATEGMS	ABYSA	292
LktA	AVADKNAS	AKKVGAGFE	LANDWENAT	KAVSSYEAQ	PKAALEASTY	SCAIS	ATNATIA	EGISIA	310
ApxIIA	GLADKEAS	TEKKAAAGFE	FANQJNAT	KAVSSYEAQ	RYASSSIC	PAALFASWV	ALAVS	EGISIA	315
H1yA	SFTSNAD	ETKVAAGFE	ETTKVJNG	KIGSQVJAG	RAQESTSA	AAAGLEASWV	TEAIS	EGISIA	318
MbxA	PLAFINVAADK	ENHANALDEF	AKQERREFK	CHIEKEYQ	GVSTIEES	E	ESTATEGMS	ABYSA	357
LktA	PLAFAGEADK	ENHAKSLES	AERPKEDD	GENLAEYQ	GTINVASWV	GENLAEYQ	ATNATIA	EGISIA	375
ApxIIA	PLASENVAADK	ENQDLIKSY	SEBEQKEDD	GORELADFH	EGELDASWV	ELNATIA	EGISIA	EGISIA	380
H1yA	PLASENVAADK	ENRANKIEE	SOREKEDD	EDDSSEAFFK	ETGALADFH	RISVMEVS	EGISIA	EGISIA	383

FIG. 4-1



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FIG. 4-2

MbxA	AAVGSARQAP	IAVGVAGVTC	ISGVIAS	NAMEEESTVAB	LOGNAMEEK	ONGCONYEDK	GYDSR	422
LktA	AAAGSVIASP	IAEVSGITG	VISTOMS	NAMEEVANK	IANKEW	NNHGKMYEN	SYDAR	440
ApxIIA	ASAGSVEGAR	VALVEAGVTC	ITTEMSX	NAMEEVANK	VLDRIVEW	KHKNVYEQ	GYDSR	444
H1yA	ATTSEJGAP	VSAEVGAVG	ITSGLEASH	NAMEEVANK	MADVIAEWK	KHGKMYEN	SYDAR	447
peak 23								
MbxA	YAYNLYANLX	ELSELENKELX	AERVIAATQO	RNDNATGEA	GIJKGEREK	SGKAYADAE	DKRKV	487
LktA	YLANLQDNMK	ELINLNKEQ	AERVIAATQO	QWDNNIGDA	GISRGKVE	SGKAYDAFE	EGKET	505
ApxIIA	HLLADLQDNMK	ELINLNKEQ	AERVIAATQO	RNDNQEGDA	AISSRTDKIS	SGKAYDDE	EGDHQ	509
H1yA	HAALIEDNFK	TESQYNEKEYS	VERSVLGQ	HDOTLGEA	GMTRNGDKE	SGKSMDYME	EGKRL	512
* 21-45								
MbxA	EAG...SNI	TEPARTGTE	TSWSNGKKTQ	AHFTSPELT	AGTESRERLT	NGKSYENKE	KEFRA	548
LktA	KAD...KU	QDSDANGID	TSWSNGKAKTO	HILFTRPLT	PGTHERERVO	TKSYEYTKX	NEY	566
ApxIIA	SYC...SSY	QDNNKGJIN	TSNTNR...KLG	SVERPTE	BEENRERITQ	EGKNSITKX	HTRV	569
H1yA	EKKPDEFQKQ	VFDPLKEND	TSST...LSDS.	LUKFTYPLT	EEEIRERRO	SGKSYEYVTEL	WGY	575
MbxA	KNEQVLD.GE	ASSSKLOESKV	IGRVA...ET	IDEI	GLUMNAKAGN	DDIFVGOCKW	NGDGS	605
LktA	DSWVYD.GA	ASSTFOLTV	VORIGJELDN	KRAKCEGD	DVFTGSGT	DNVFTGSSH	EDGEC	630
ApxIIA	DSWVYD.GD	ASSSVETVW	VORIAYKFDD	AGNVIIESDQ	KIDANAGDN	DNVFTGSSH	VEDGE	633
H1yA	DRKIVYGVQD	KGSVYEVSNL	IGHASY...	EN.NQYREI	RJFESHGDD	DKWLSAGSA	WYAG	634
MbxA	DGHDRYFYSK	DSEGEENYED	GTSAFEGASY	DIYHEWVRO	ETKSGKRTET	EDYRD	669	
LktA	EGHDRYFYSR	DSEGEENYED	ATNEEFOSSY	KAHHEVTEH	TALGNBEEK	SEKRS	692	
ApxIIA	DGHDRYFYSR	DSEGEENYED	ATAEFEGCSY	SWKHNDS	QINVNEEKEH	TEKRA	695	
H1yA	KGDWMMNDK	T.DTGYMTEP	GTNAEAGN	EVSEVWKEQ	EVSEVWKEQ	TQRS	698	



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FIG. 4-3



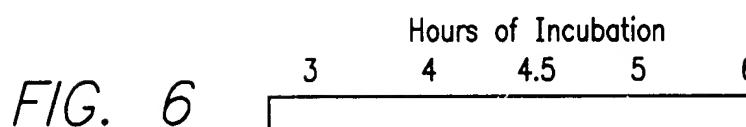
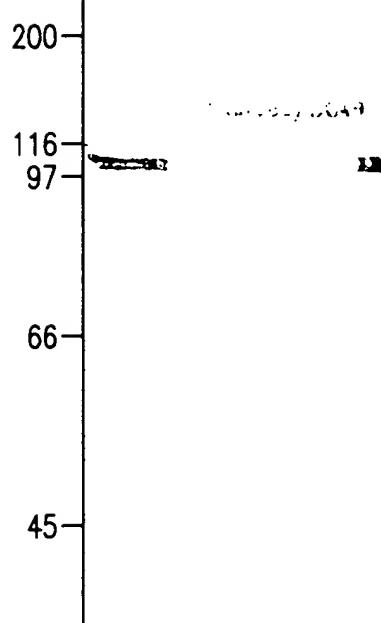
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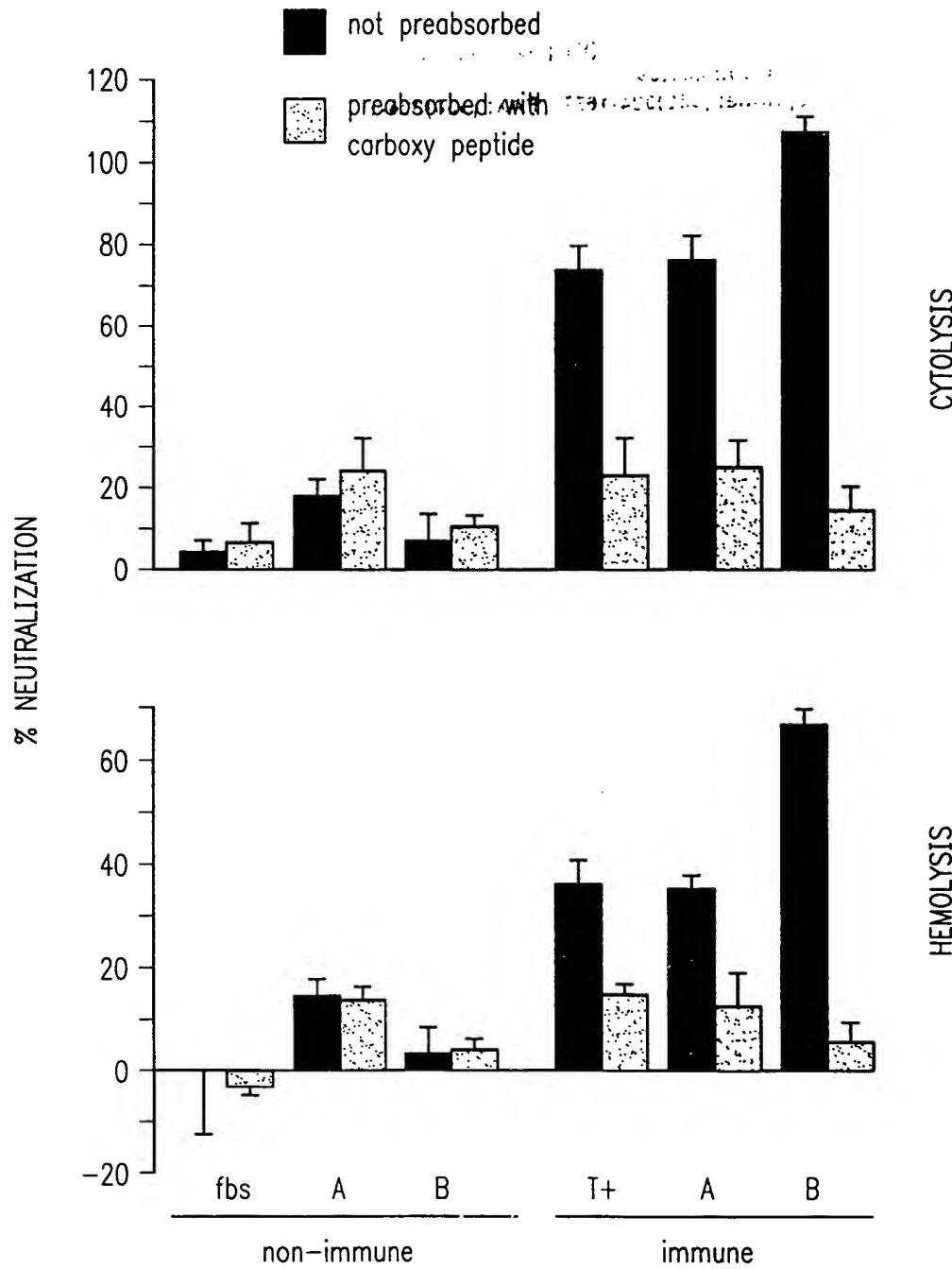


FIG. 7



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FIG. 8-1

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1 ATGGGTGGTGTACTCTTTAATTAGACTAATTACAAACCCCTAATAGTAATTTAGTT 60
1 M G G D T S L I R N L Q T L N S N L V 20

61 ATGATAGATTATGCTCAACAAACCTGCTCTATCTGCTCTGGTTATCCTGCCAAATACTAT 120
21 M I D Y A Q Q P A L S A L V I L A K Y Y 40

121 GGTATTTCTGCAAGTCCAGCAGACATTATGCATCAGTTCTGATAAAACAAAAAGGAGAC 180
41 G I S A S P A D I P M S H A T Q W F S T D N N C T D K G D 60

181 CTGAATGAAATTGAATGGATGTTGGCAGCAAAGAAATTAGAATTAAAGGTAAAGGATTATA 240
61 L N E I E W M L A A K K L E L K V K I I 80

241 AACAGCCTTAACTCGATTGTCATGATAACACTTCCTGCTTGGTGTGGTGTGATAAT 300
81 K Q P L T R L S M I T L P A L V W C D N 100

301 AAGCCCGATTTAGATCAAAATTAAACTCTCATTTATACTAACTAACTAAATTGATGGGTG 360
101 K P D L D Q N L N S H F I L T K I D G V 120

361 GGATCTGCTGCAAAATATCTCATCTACGATTGATTGAGAATCGTCCCATAATATTAGAT 420
121 G S A A K Y L I Y D L I E N R P I I L D 140

421 GCAAGTGAGTTCTGAAAGATATTCTGGTAAGTTAATGCTAGTAACCTCCGTGCGTCA 480
141 A S E F S E R Y S G K L M L V T S R A S 160

481 ATATTGGGTTCATGGCTAAATTGATTTACTTGGTTATTCTGCGGTAAATCAAATAT 540
161 I L G S L A K F D F T W F I P A V I K Y 180

541 CGTTATATTTTTTGAAAGTCATCGTTATTCAGTGGTGTACAGATTGCTCTGATT 600
181 R Y I F F E V I V I S V V L Q I F A L I 200

601 ACGCCATTGTTTTTCAGGTTGTGATGGATAAGGTATTGGTGCATCGTGGTTTCTACT 660
201 T P L F F Q V V M D K V L V H R G F S T 220

661 CTGGATGTGGTAGCGATTGCCTGGTAGTAAGTTATTGAAGTCATTTAAGTGGT 720
221 L D V V A I A L L V V S L F E V I L S G 240

721 CTACGCACTTATATTTGCTACACACCTCTCGAATTGATGTAGAGCTAGGAGCACGA 780
241 L R T Y I F A H T T S R I D V E L G A R 260

781 TTATTTCGTCATCTATTAGCTACCGCTTGTCTATTGAGAGTAGAAGAGTAGGCGAT 840
261 L F R H L L A L P L A Y F E S R R V G D 280

841 ACAGTTGCACGTACGTGAATTGGAACATATCCGCAATTCTTAACGGTCAAGCTCTC 900
281 T V A R I R E L E H I R N F L T G Q A L 300

901 ACTTCAGTTTAGATTGGTGTCTATTCTGTTGTAATGTGGTATTACAGC 960
301 T S V L D L V F S F I F L F V M W Y Y S 320



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FIG. 8-2

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961 CCTACTTTAACACTGGTAGTTTGGCATCATTACCAATATGCGTTTGGTCTGCCTT 1020
321 P T L T L V V L A S L P I Y A F W S A F 340

1021 ATTAGCCCAATTTACGCACTCGACTAAATGATCAATTGACCGCAATGCAGATAATCAA 1080
341 I S P I L R T R L N D Q F A R N A D N Q 360

1081 TCTTTTTAGTGGAAAGTATTACTGCGGTTGGTACGGTAAAGCAATGGCAGTTAACCT 1140
361 S F L V E S I T A V G T V K A M A V E P 380

1141 CAAATGACCCGTCGCTGGGATAATCAATTAGCAGCTTATGTGGTTCTAGTTTCGGGTA 1200
381 Q M T R R W D N Q L A A Y V V V S S F R V 400

1201 GCTAAGTTGGCAATGGTTGGCAGCAAGGAGTACAACTCATTCAAAGATGGTTATTGTG 1260
401 A K L A M V G Q Q G V Q L I Q K M V I V 420

1261 GCAACTCTATGGATTGGTGCAGGAAATTGTAATTGAAGGCAAGCTATCGTAGGTCAATT 1320
421 A T L W I G A K L V I E G K L S V G Q L 440

1321 ATAGCATTAAATATGCTGGCAGGTCAAGGTGGCCGCTCCTGTTATCCGCCTGGCACAGCTA 1380
441 I A F N M L A G Q A A P V I R L A Q L 460

1381 TGGCAAGATTTCAGCAAGTAGGTATTCAGTGGCAGATTGGGTGATATTTAAACT 1440
461 W Q D F Q Q V G I S V A R L G D I L N T 480

1441 CCAACTGAGCATTCTACATCTCGCTTAACCTTACCTGATATTAAGGGTGATATTACATT 1500
481 P T E H S T S R L T L P D I K G D I T F 500

1501 GAAAATGTTGATTTCGCTACAAATAGATGGCATTAAATATTACAGAATTAAATT 1560
501 E N V D F R Y K I D G H L I L Q N L N L 520

1561 CAGATTAACGCTGGAGAGATACTAGGTATCGTAGGACGCTCTGGTTCAAGTAAATCAACA 1620
521 Q I N A G E I L G I V G R S G S G K S T 540

1621 TTGACAAAATTAGTACAGCGTTATGTACCAAGAAAATGGCGAATATTAGTTGATGGA 1680
541 L T K L V Q R L Y V P E N G R I L V D G 560

1681 AACGATTTGGCATTAGCTGATCCGCTGGCTCGCGCCAAGTGGGTGTTGGCAG 1740
561 N D L A L A D P A W L R R Q V G V V L Q 580

1741 GAAAATGTGTTACTCAATCGTAGTATTGAGATAATATTGCCCTAACTGATAACGGGCATG 1800
581 E N V L L N R S I R D N I A L T D T G M 600

1801 TCATTAGAGTTTATTATCCAGGCTGCCAAGATGTCTGGGGCACATGACTTTATTATGGAA 1860
601 S L E F I I Q A A K M S G A H D F I M E 620

1861 TTGCCTGAGGGTTATGATACGATTGGAGAGCAAGGTGCAAGGCTGTCAGGTGGACAA 1920
621 L P E G Y D T I V G E Q G A G L S G G Q 640



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1921 CGCCAGCGTATCGCTATTGCGCGTGTAAATTACCAATCCGCGTATTTGATTTGAT 1980
641 R Q R I A I A R A L I T N P R I L I F D 660

1981 GAAGCTACTAGTCATTAGACTATGAGTCGGAAAGGGCTATTATGCAAAATATGCAGGCA 2040
661 E A T S A L D Y E S E R A X M Q N M Q A 680

2041 ATTTGCCAAGGTAGAACAGTGTGATTATTGCACATCGCTTATCTACCGTAAAAATGGCA 2100
681 I C Q G R T V L I I A H R L S T V K M A 700

2101 CATCGCATTATTGCAATGGACAAGGGAAAATTGTAGAGCAAGGCACACATCAAGAATTG 2160
701 H R I I A M D K G K I V E Q G T H Q E L 720

2161 TTGCAAAAAGAAGATGGTTACTATCGTTATTATGATTTGCAGAATGGATAAA 2215
721 L Q K E D G Y Y R Y L Y D L Q N G *

FIG. 8-3



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MbxB	~~~MED	BAQQPATES	EWIPEAKING	ISASPADIM	EDESDNTK	DENEIEME	AKKLEI	55
LktB	MEAN	QRND	L...ELVA	ELMAYOEN	ISLPEEK	SEAWAL	AKSAL	56
ApxIB	IBFYRE	ED	X...ELVA	ELMAYOEN	IAINPEEK	SEAWAL	AKSAL	55
H1yb	ODDSCH	ED	Y...ELVA	ELMAYOEN	ISVANPEEK	SEAWAL	AKSAL	55
MbxB	~~~MED	TRISMET	ALWCONKP	DLDQNLNSA	ELJK	EGV	GSAAKLEY	116
LktB	RIKI	KOPE	SPHLINE	ALWCONKP	ELJK	EV	TDNPKAY	116
ApxIB	CHIKKE	SPHLINE	ALWCONKP	ELJK	EV	ELK	NEAKKIF	107
H1yb	KAKK	SPHLINE	ALWCONKP	ELJK	EV	ELK	NEAKKIF	106
MbxB	~~~MED	ERISKEEM	WTSRASILS	SEAKEDTM	ELJK	EV	SEIETOE	106
LktB	QESTDEF	ACKOGIT	WTSRASILS	SEAKEDTM	ELJK	EV	SEIETOE	106
ApxIB	RIVER	SEXOCK	WTSRASILS	SEAKEDTM	ELJK	EV	SEIETOE	106
H1yb	ANTESEE	ALYOGHT	WTSRASILS	SEAKEDTM	ELJK	EV	SEIETOE	106
MbxB	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
LktB	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
ApxIB	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
H1yb	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
MbxB	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
LktB	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
ApxIB	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
H1yb	ALTPLEFO	YMDKLYW	RGESTDIV	AKAULV	EM	YIEEEMV	SVIEOEE	177
MbxB	APRERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
LktB	AKERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
ApxIB	AKERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
H1yb	AKERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
MbxB	APRERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
LktB	AKERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
ApxIB	AKERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
H1yb	AKERHEA	PLADEFER	ACUDIYAR	RELEHINE	EM	EXEANTS	YIEEEMV	238
MbxB	SPJ	EWI	ASTRIYAF	SAPISTER	TRINDOFA	ESIHAVGM	KAWAVER	360
LktB	SPK	EWI	ASTRIYAF	SAPISTER	TRINDOFA	ESIHAVGM	KAWAVER	360
ApxIB	SPK	EWI	ASTRIYAF	SAPISTER	TRINDOFA	ESIHAVGM	KAWAVER	360
H1yb	SPK	EWI	ASTRIYAF	SAPISTER	TRINDOFA	ESIHAVGM	KAWAVER	360

FIG. 9-1



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FIG. 9-2

MbxB	QMTTWDQ	LAIVVSSE	RYAKLAMUS	QQGYQTLQX	WIVMATEW	GAKEVIEGK	LSVWQJ	421
LktB	QMTDTWDQ	LAIVVSSH	RYAKLATIS	QQGYQTLQX	WIVMATEW	GAHVISGQ	LSVWQJ	412
ApxB	QMTNTWDQ	LAIVVSSH	RYAKLATIS	QQGYQTLQX	WIVMATEW	GAHVISGQ	LSVWQJ	411
H1yB	QMTNTWDQ	LAIVVSSH	RYAKLATIS	QQGYQTLQX	WIVMATEW	GAHVISGQ	LSVWQJ	411
MbxB	AFNMLAGQ	LAIVVREAQ	WQDFQWQ	SVARLQD	WIPTEHST	SRTELEPK	GBFIFEN	482
LktB	AFNMISQY	LAIVVRAAQ	WQDFQWQ	SVARLQD	WSPHEQX	GRISFEM	SD1SEKN	473
ApxB	AFNMISQY	LAIVVRAAQ	WQDFQWQ	SVIRGQY	WSPTESYQ	GRALPEK	CD1TERN	472
H1yB	AFNMISQY	LAIVVRAAQ	WQDFQWQ	SVIRGQY	WSPTESYH	GRALPEH	CD1TERN	472
MbxB	YDFRYKIDG	HLIILQNL	QINAGEILG	YGRSGGK	SUTXEMOR	WMPENGR	WDEGNDL	543
LktB	YDFRYKPA	HLIILQNL	QINAGEILG	YGRSGGK	SUTXSLQR	WYIPENGR	EDGHDL	534
ApxB	YDFRYKPA	HLIILQNL	QINAGEILG	YGRSGGK	SUTXSLQR	WYIPENGR	EDGHDL	533
H1yB	YDFRYKPA	HLIILQNL	QINAGEILG	YGRSGGK	SUTXSLQR	WYIPENGR	EDGHDL	533
MbxB	ALADPWR	ROYGWYQE	NWELNRST	DNTALTEIS	ASHEF11QIA	WAMSGAHF	WMEPEG	604
LktB	ALADPWR	ROYGWYQE	NWELNRST	DNTALTEIS	WMMERVYIA	AKLAGAHF	WSELRG	595
ApxB	ALADPWR	ROYGWYQE	NWELNRST	DNTALTEIS	WMMERVYIA	AKLAGAHF	WSELRG	594
H1yB	ALADPWR	ROYGWYQE	NWELNRST	DNTALTEIS	WMMERVYIA	AKLAGAHF	WSELRG	594
MbxB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	665
LktB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	665
ApxB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	665
H1yB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	665
MbxB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	655
LktB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	655
ApxB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	655
H1yB	YDTIVGEQ	AGLSSGQD	RYATARAH	TMKHTH21	FAISALDYE	SETRAMNM	QAIQSR	655
MbxB	YVLLAIRE	STVQIAHE	YANOKKRY	EDDIEYTR	EDDIEYTR	EDDIEYTR	EDDIEYTR	717
LktB	YVLLAIRE	STVQIAHE	YANOKKRY	EDDIEYTR	EDDIEYTR	EDDIEYTR	EDDIEYTR	708
ApxB	YVLLAIRE	STVQIAHE	YANOKKRY	EDDIEYTR	EDDIEYTR	EDDIEYTR	EDDIEYTR	707
H1yB	YVLLAIRE	STVQIAHE	YANOKKRY	EDDIEYTR	EDDIEYTR	EDDIEYTR	EDDIEYTR	707



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FIG. 10

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1	ATGACGAAAAAGTTGCAGAGCTAGGTTAATTGCATGGCTTGGCTAACTCTGATATG	60
1	M T K K F A E L G L I A W L W S N S D M	20
61	CATAAACATTGGACGTTGTCTTGTGCGACCAATGTTATTCCGGCAATTGAGACAGGT	120
21	H K H W T L S L F A T N V T P A I E T G	40
121	CAATATGTTATATTGAAAAGAGAAGATATGCTGTAGCATATTGTTAGTGGGCTAAACTT	180
41	Q Y V I L K R E D M P V A Y C S W A K L	60
181	AGTTTAGAAAACGAGGTTAAATATTAACGATGTTACTCTCTTAAGTTAGATGACTGG	240
61	S L E N E V K Y I N D V T S L K L D D W	80
241	CAGTCAGGTGACCGAAACTGGTTATTGACTGGATTGCTCCATTGGCGATAGTCTTACA	300
81	Q S G D R N W F I D W I A P F G D S L T	100
301	CTCACAAAACACATGAGAACGTTATTCAGATGAATTGTTAGAGCGATTGTTAGAT	360
101	L T K H M R T L F S D E L F R A I R V D	120
361	GGAAATTCAATCGCATGGTAAGATATCTGAATTGAAAGTCTGTTGATTCAAAATTA	420
121	G N S S H G K I S E F Y G K S V S S K L	140
421	GCCTCAAGAATATTCACAATATCACGAAGATTGACCGAGCAAATTGTCACTCAGAAT	480
141	A S R I F A Q Y H E D L T S K L S T Q N	160
481	AATTTTATTATATCTAAAGATAATTAA	507
161	N F I I S K D N *	169



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MbxC	---MTKFAE	GLIAWNSN	SHKNTES	FTCOY	42
LktC	--MNOVSYNL	SNTHMN	SHKNSCE	ENEDY	43
ApXIC	MSKKINGEEN	GEVARWAS	SPYRKPS	ESNOT	45
H1yc	-MNRNAPL	GHVSNEWAS	SPLRNPKVS	RANQY	44
MbxC	WILKREDMV	AYCSWANSH	ENKINDY	SDANW	87
LktC	MLIDNGIRI	AYCSWADNE	ENKINDY	NTPEENQ	88
ApXIC	WILKRDFFI	AYCSWANDNE	ENKINDY	ASVADDNTS	90
H1yc	ALTRDNYV	AYCSWANSH	ENKINDY	TSKNEANNT	89
MbxC	FIDWTAPEGD	SLTUKHMT	TSPELTAT	RUGNSS.HG	131
LktC	TDWTAPEGD	SOLLYKNCQ	KPBMWST	RYXPKQELG	133
ApXIC	FIDWTAPEGD	SAYKMPD	NEENEFRAT	RWDPSR.VG	134
H1yc	FIDWTAPEGD	NGALLYKMK	KFDELFRAI	RYDRKTH.VG	133
MbxC	YBKSVD	TSKNEON	TSKNEON	TSKNEON	168
LktC	KGCK	TKK	TKK	TKK	167
ApXIC	KGCK	TKK	TKK	TKK	172
H1yc	KGCK	TKK	TKK	TKK	170

FIG. 11



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FIG. 12-1

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1 ATGTTTATAACAAGCACTAAAGATTTTTTATTGCTATATAACCGTTGGCGCAATACA 60
1 M F I Q A L K D F I R Y I T V W R N T

61 TGGGCAGTTGAGACCAACTAACCCCTCTAACCGTACTAAAGAAGAACTCGCTTTCTT 120
21 W A V R D Q L T P P K R T K E E L A F L 40

121 CCTGCACATCTAGAACTCACTGACACACCTGTATCCAGATCTTCTAAGTGGACAGCTAGA 180
41 P A H L E L T D T P V S R S S K W T A R 60

181 ATAATCATGATATTGCTCTATTGCTTGTATGGCTTGGGTTGGACAGATTGACATT 240
61 I I M I F V L F A L L W S W V G Q I D I 80

241 GTTGCTACAGCTTCAGGTAAAATTCTTCAGGTAGCCGTAGCAAGACTATTCAATCTTG 300
81 V A T A S G K I S S G S R S K T I Q S L 100

301 GAAACAGCGATAGTTAAGCAGTTATGTACGTATGGTCAAAATGTTCAACAAGGTGAA 360
101 E T A I V K A V Y V R D G Q N V Q Q G E 120

361 ATATTAGTAGATTAGTTAGGGATCGGTTAGATAGTGTATGGCTCAGTCCGAGAAAGCC 420
121 I L V D L V G I G S D S D V A Q S E K A 140

421 CTTCGAGCAGCGCAATTATCTAACGCTACGCCCTGAAGCAATTTCAGCATTAAATCAC 480
141 L R A A Q L S K L R L E A I L S A L N H 160

481 CGTATTAACTCCTCAGATTGATGTAGCATATGCAAAGTCTTAAATATTCAGAATCGGAA 540
161 R I N P Q I D V A Y A K S L N I S E S E 180

541 ATTAATGAAGCTAAACTTAGCCAAAATCAATATCAAGCATGGTTAGCACAAGATGAA 600
181 I N E A Q T L A Q N Q Y Q A W L A Q D E 200

601 CAACTAAAATTAACCTAAAAGGACATCAAGCAGAATTACAATCTGCTCGATCCCAAGAA 660
201 Q L K L T L K G H Q A E L Q S A R S Q E 220

661 CAAAAGTTGGTTCAAGTTGGTCAATTGAAACATCAAAAGACTGATGATTATGGAGTCTC 720
221 Q K L V S V G A I E H Q K T D D Y R S L 240

721 AAAGCAGAAAATTATCTGAGCATGCTTATCTAGAACAGAAAGCAAATTACTTAGC 780
241 K A E N F I S E H A Y L E Q E S K L L S 260

781 AATCAAAATGATTACAAAGTACACGTAGTCAGATTCAAAAATACAGGCTGCAATCATG 840
261 N Q N D L Q S T R S Q I Q K I Q A A I M 280

841 CAAGCTGAACAGAACCGTATGTTATACTCAAAATCTAAAACGTGATACTTAAAGCTAAGCAG 900
281 Q A E Q N R M L Y T Q N L K R D T L E S 300

901 TTACGCCAACCAATGAACAGATTAATCAATATCTGGTCAAACTAATAAGCTAAGCAG 960
301 L R Q T N E Q I N Q Y T G Q T N K A K Q 320



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FIG. 12-2

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961 CGACAGAAATTGCTGAGTATTAATCACCTGTTAATGGTACTATACAAGAGCTAACAGCT 1020
321 R Q K L L S I K S P V N G T I Q E L T A 340

1021 TATACTTTAGGTGGAGTTGTACAAGCAGCACAAAAATTATGGTTGTGGCACCTAACGAT 1080
341 Y T L G G V V Q A A Q K I M A V V A P N D 360

1081 AATCAAGTGGAAAGTAGAGGTATTAGTGCTAAATAAGATATCGGCTTGTAAAAGCTGGG 1140
361 N Q V E V E V L V L N K D I G F V K A G 380

1141 CAGAATGTTATCATCAAAATCGAGAGTTTCCTTACACGTTATGGTTATTTAACAGGT 1200
381 Q N V I I K I E S F P Y T R Y G Y L T G 400

1201 AAAATAAAAAGTATTAGTCATGATGCTATAGAACATCAACATTAGGTCTAGTGTATACT 1260
401 K I K S I S H D A I E H Q H L G L V Y T 420

1261 GCACTTGTTCTTGATAAAAGCACATTAAATATAGATGGAGTAACAATCAACTAACG 1320
421 A L V S L D K S T L N I D G V T I N L T 440

1321 CCAGGAATGAATGTTACTGCTGAAATTAAAACAGGTAAACGTCGTGTTGGATTATATA 1380
441 P G M N V T A E I T G K R R V L D Y I 461

1381 TTAAGTCCATTGCAGACAAAAGTTGATGAAAGTTTCGAGAACGCTAA 1428
461 L S P L Q T K V D E S F R E R * 476



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FIG. 13-1

MbxD	~MF1QALXO	FURVIIWWR	NEMANRQDET	PAPRKEELA	ELPAHLELJD	48
LktD	~MKJLNSGYE	FERRYKNIWA	EWIKERKEED	HPIRKDSE	ELPAHLELIE	50
ApxID	~MKTWNGYEH	FHQRYKTWV	EJWKEERKQD	HPIREKDENE	ELPAHLELIE	50
H1yD	~MKTNMGFSE	HERRYKIVWS	EJWKEERKQD	HPIREKDENE	ELPAHLELIE	50
MbxD	TPVSRSSKWT	ARTIMMIAVLF	ELWSMVGQI	IVATASGKJ	SSGSRSKTRIO	98
LktD	TPVSKRPREJ	AXLQMLEFLV	ALVNASVSKV	EVATAPSKJ	TESGRSKERK	100
ApxID	TPVSKKPREJ	AXLQMLEFLV	ALVISNISHV	EVADATGKJ	AESDRSKERK	100
H1yD	TPVSRPREV	ANFNGELVJ	AFLESLGQV	EVATANGKJ	TESGRSKERK	100
MbxD	SIEJIAJRAV	YMPBQCNVQO	CEJUVIVGJ	CSFSDVAQSE	KADRAQESK	148
LktD	PTEANAVQEF	FVKDQEVK	GOLVSETAL	GSADIKKJ	ASLSTEAKEN	150
ApxID	PTEANALVET	FVQDGFEVK	DQELHFEAL	GAAPQQKJK	SSLSFKEKJ	150
H1yD	STENSIYKEI	INREGESVRS	GDVLLKTAJ	GAEADTLKJQ	SSSLQARLQ	150
MbxD	URLEAITSAL	NHRINQDQY	AYAKSLNIS	EESEINEAQTE	AQNOYQALIA	197
LktD	TRYOTLJAT	EKESEFVD	:SRTEKDS	EEDRERIKHJ	EEQYTTWOK	199
ApxID	TRYETLJAN	AADREPLIEJ	.TKDEKHA	EEDKTRIVL	EEQFEAKOK	199
H1yD	TRQESRSHE	ELNKJFELKJ	PDEPYEQNVS	EEEVERLTSJ	EEQFTWGN	200
MbxD	QDEQKJTEK	GHQAFELDSAR	SOEQQLVSYG	AIEHOKTDY	RSKEAENFES	247
LktD	QKTTQKJ	RKEAEROTF	AYVTKZEGAT	RIEQEKEKJ	KAYKQES	249
ApxID	QKJQKEALQ	RKEAEROTF	ANERGEGIS	RKEERKJ	KKFNSKSTS	249
H1yD	QKJQKEALQ	RKEAEROTF	ARENENVS	RKEKSREDJ	RSJLHKQAFQ	250
MbxD	EBYVTEQESK	USNENDQOS	TRSOJOKTA	AIMGAEONRM	GYTNNURDT	297
LktD	YNEUJAGENK	LIENKEEL	DLINKEEL	LIQEFKSDM	299	
ApxID	YKDVWJENR	HEEMANER	DLRAKEETH	LIQEFKTRAD	299	
H1yD	YKDVWJENR	YVEMANERY	EIESAKERQ	LMQFKEENL	300	



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FIG. 13-2

MbxD	TESPOTNEQ	INOMEGOTNIK	AKQDQKLLSI	ESPAWNTGIE	ETAYTIGGVY	347
LktD	LEK	KOHJEN	EROTREEEK	RAPVSGTQG	ETHTTGGVY	349
ApxID	LEK	KONVEA	ERQDSEEK	RAPVSGTQG	XTTBVGGVY	349
H1yD	DKERQTD	IELELLEEK	NEORQDASY	RAPVSGTQG	ENVTEGGVY	350
MbxD	QATQKIMWVA	PNDNOVEEV	TKDGEV	KAGQWVTKI	ESFPYTRYGV	397
LktD	TTAEITMIV	PEDWVHATA	ENPKDGEV	AAGGEVTKV	ETFPYTRYGV	399
ApxID	TTAEITMIA	PEDDWVHATA	TKDGEV	EVGDAVTKV	ETFPYTRYGV	399
H1yD	TTAEITMIV	PEDDWVHATA	YQNKGEV	NGONAEVKV	EAFPYTRYGV	400
MbxD	TGKXSESH	DATDQHGE	WVIAWVSLDK	STEIN IDWV	INITPGWV	446
LktD	TGKXHISP	DATDQPNVGE	WVIAWVSLDK	KNITSPOSRK	DISSESENTIS	449
ApxID	MSKXKNTT	DATDQPNVGE	WVIAWVSLDK	KLISGKOGKE	ELIGGMSV	449
H1yD	LVGSXKATNE	DATDQPNVGE	WVIAWVSLDK	NDLST.GNKH	IPESGMAK	449
MbxD	AETXKRM	DDVILSPQT	KDDEFRE	475		
LktD	AETXKERSH	MSXGLSPQT	SXZFSER	478		
ApxID	AETXKERSV	MSXGLSPQT	SXZFSER	478		
H1yD	AETXKEMSV	MSXGLSPQT	SXZFSER	478		

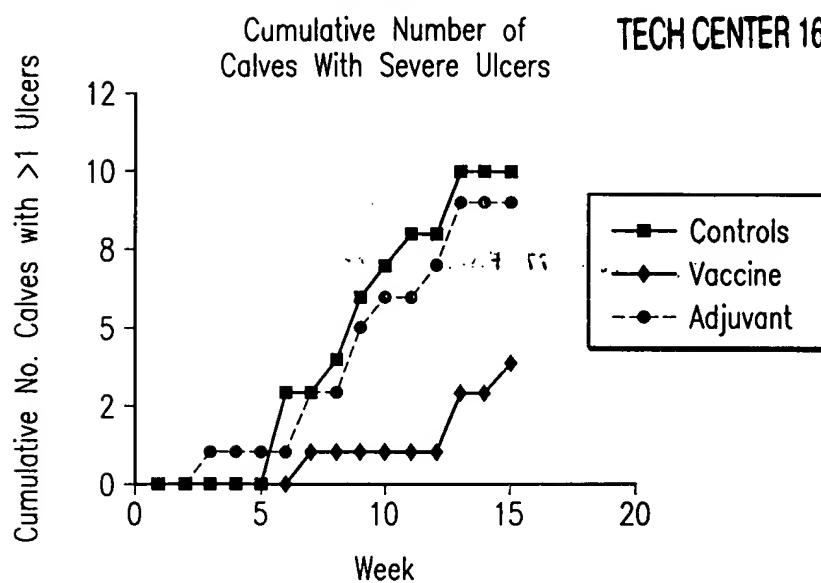


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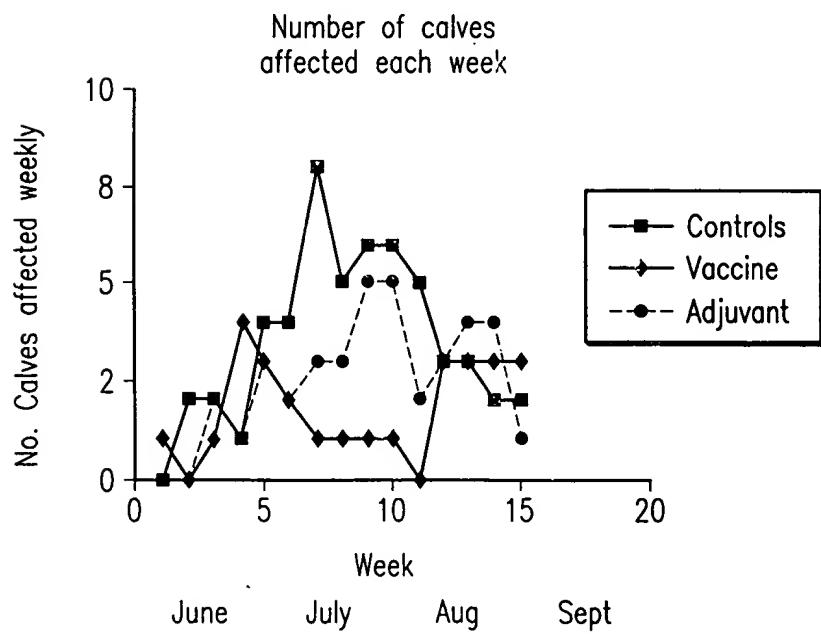
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Number of calves with ulcers with clinical scores >+2

FIG. 14



Number of calves affected weekly in 1 group of vaccinated calves and in controls.

FIG. 15

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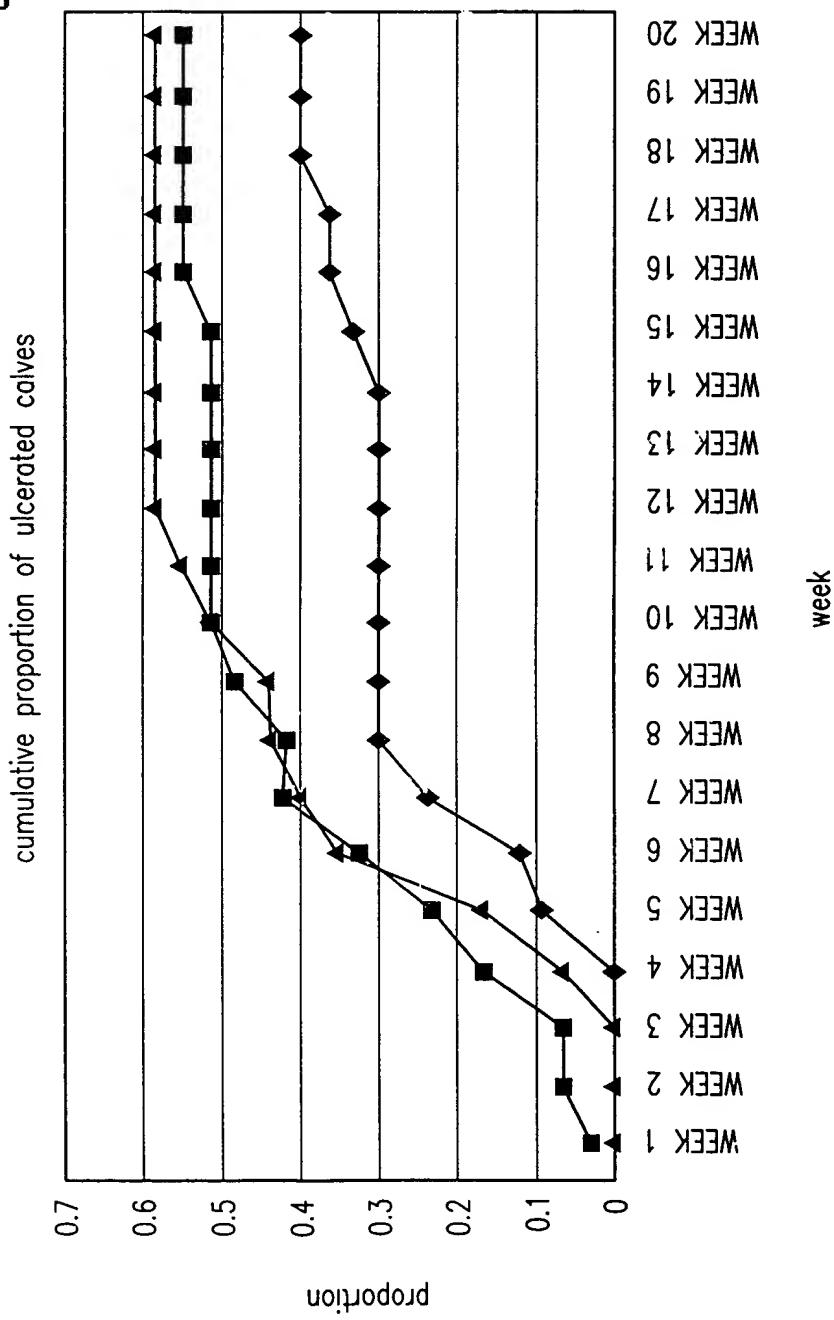
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■ ADJ group
▲ CTRL group
◆ VAC group

FIG. 16



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